



# IMPLEMENTATION OF STUDENT WORKSHEET BASED ON GUIDED INQUIRY ON THE TOPIC OF MOLECULAR GEOMETRY IN GRADE X

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## ABSTRACT

This study aimed to reveal the differences in student learning outcomes by using two worksheets, among student learning outcomes by using guided inquiry-based worksheets with MGMP worksheets that usually use at that school. In the learning process by using guided inquiry learning model, students were guided to find the concept itself in small groups. The learning model matched with the demand of Curriculum 2013 which requires an active participation from the students through 5M activities (observing, asking, collecting data, associating and communicating). This research was a Quasi Experimental Research by using an expanded Randomized Control Group Posttest Only Design. The samples of this research consisted of two classes; 1<sup>st</sup> experimental class and 2<sup>nd</sup> experimental class which were formed through cluster sampling. Based on the test results obtained by the average value in the knowledge competence, the 1<sup>st</sup> experimental class' result (65.34) was higher than the 2<sup>nd</sup> experimental class' (45.16). Both of Normality and Homogenous's results showed that the distribution of the two experimental classes were normal and homogeneous, the data analysis which was performed by using t-test. Based on the analysis, it showed that there were significant differences in learning outcomes among the students who used guided inquiry-based worksheets and MGMP worksheets on molecular geometry material.

**KEYWORDS:** Guided Inquiry, Learning Outcomes, Student Worksheet.

## INTRODUCTION:

In the 2013 curriculum requires learning by using a scientific approach and a learning model that encourages learners more actively through observing, questioning, gathering data, associating and communicating<sup>[1]</sup>. The instructional model suggested by the Directorate of High School Development of Middle Education on the 2013 curriculum includes an inquiry learning model<sup>[2]</sup>. The inquiry model that suits the demands of the 2013 curriculum and is suitable for middle school students is a guided inquiry model. Learning activities that apply guided inquiry consist of 5 stages: orientation, exploration, concept formation, concept application and cover<sup>[3]</sup>. These five stages contain observation, questioning, data gathering, association and communicating activities demanded in the curriculum of 2013. To support learning activities with guided inquiry model used worksheet based on guided inquiry (WBI).

There are key questions (critical thinking question) in WBI. Hanson reveals that "the key question is at the heart of guided inquiry learning."<sup>[3]</sup> The key questions that exist in the worksheet, starting with easy questions and then becoming more difficult. This question is answered by students by discussing through observation and model analysis so that students will be led to find the concept. The worksheet used in this study was prepared by Aditiya, S.Pd in 2013 which has fulfilled the validity, practicality, and has not tested its impact on learning outcomes. This worksheet contains about molecular geometry material where molecular geometry material is one of the materials taught in X class high school in 1<sup>st</sup> semester.

Based on the observation of the author in one of high school from August to December, there is no worksheet based guided inquiry in that high school. Students in that school using MGMP worksheet. The MGMP (deliberations of subject teachers) is a peer-to-peer forum, peers and peers of science, who are determined to define the right strategy to improve the learning process<sup>[4]</sup>. The MGMP worksheet prepared by the MGMP team consists of the conclusions of teaching materials and practice questions. Unlike WBI, MGMP worksheet has not met the demands of the 2013 curriculum, has no model and it is printed on newsprint with black ink only, so this worksheet does not have an attractive color as found on worksheet based guided inquiry.

## MATERIALS AND METHODS:

This type of research is quasi experiment research, is a study that does not control all variables related to the sample except some variables required in the study<sup>[5]</sup>. The research design used is the expanded Randomized Control Group Only Design. The sample was taken by cluster sampling technique. The classes selected as sample groups are X class MIA 4 as 1<sup>st</sup> experimental class and class X MIA 3 as 2<sup>nd</sup> experimental class.

This research is conducted in three stages, preparation stage, implementation stage and final stage. At the implementation stage, the 1<sup>st</sup> experimental class uses WBI and the 2<sup>nd</sup> experimental class using MGMP worksheet on molecular geometry material. In the final stages of the study, a final test is conducted in both groups, followed by data processing and the last is to draw conclusions. To analyze the truth of data of research result used hypothesis test that is by testing equality of two mean of test of two parties<sup>[6]</sup>. Previously, the normality test and

homogeneity test were done first.

## RESULTS:

From the second grade sample, the data obtained in the following table.

**Table 1. Average Score, Standard deviation, and Variance**

Group	$\Sigma Xi.Fi$	N	$\bar{x}$	S	S <sup>2</sup>
1 <sup>st</sup> Experimental	1895	29	65,34	17,42	303,44
2 <sup>nd</sup> Experimental	1400	31	45,31	14,1	199,13

From Table 1 shows that the learning outcomes of the 1<sup>st</sup> experimental class students is higher than in the 2<sup>nd</sup> experimental class. To test whether there is a significant difference between the classes using WBI with the MGMP then hypothesis testing. From normality test and homogeneity test of 1<sup>st</sup> experiment class and 2<sup>nd</sup> experiment class shows that both groups are normal distributed and have homogeneous variance. Therefore, to test the hypothesis used t test.

**Table 2. T Test Results**

Group	N	Rata-rata	S <sup>2</sup>	t <sub>h</sub>	t <sub>i</sub>
1 <sup>st</sup> Experimental	29	65,34	303,44	5,11	2,00
2 <sup>nd</sup> Experimental	31	45,16	199,13		

Table 2 shows that  $t_{count} = 5.11$ ,  $t = 5.11$  is outside the acceptance area of  $H_0$ . Thus, it can be concluded that  $H_1$  is received at a real level of 0.05 which means that there are significant differences in learning outcomes in both classes of samples.

## DISCUSSION:

Based on the description and analysis of the data obtained, it can be seen that there are differences in student learning outcomes in the two sample classes where the students' learning outcome in the 1<sup>st</sup> experimental are significantly higher than the 2<sup>nd</sup> experiment class. The learning outcome obtained are influenced by the worksheet used during the learning process. In the guided inquiry learning model, students work in small groups. Through group learning systems, students work together to build understanding and knowledge, so that students learn more, understand more and remember more<sup>[7]</sup>. Learning by using WBI can attract students' interest in learning, because on a guided inquiry based sheets are modeled and accompanied by attractive colors for students. Students active discuss with the group and students can find their own concept. According to Straumanis, the implementation of guided inquiry learning model will be more effective if students discuss in groups (consisting of 3-4 people) working with worksheets, where the worksheet is specially designed to meet the stages in the guided inquiry learning model<sup>[8]</sup>. The WBI used in this study meets all five stages in the guided inquiry learning model. The five stages of the guided inquiry learning model are orientation, exploration, concept formation, application, and cover<sup>[3]</sup>. The orientation stage, on the worksheet there is a pre-requisite knowledge, ie materials that have been studied students where the material is required of students to study the material geometry molecule.

Exploration stage, students will read the information and then analyze the model in the form of pictures and tables where in analyzing the student model guided by the key question. Key questions start from simple questions that can motivate students in answering the next question and these key questions are interconnected with one another, making it easy for students to understand and also making it easier for students to find concepts. Hanson reveals that the key question is the heart of guided inquiry learning that will guide students in exploring models so that students can build an understanding of concepts related to the material being studied.

The concept that students have obtained will be applied by answering exercises and questions at the application stage, one of the guided inquiry goals is to improve students' ability to solve problems<sup>[7]</sup>. Exercise can further strengthen the students in understanding the concept because the exercise presented is a direct application of the concept. During the discussion, the students seemed enthusiastic to answer the key questions and also in doing the questions and the exercises.

In the last stage of the closing stage, where one of the group's representatives will advance to the class and present the results of the discussion, another group will add, give criticism or suggestions. Enthusiasm from students is also seen at this stage. Students are competing to express their conclusions about the concepts that exist in the molecular geometry material. This is in accordance with previous research conducted by Bilgin<sup>[9]</sup> and Myers<sup>[10]</sup> it was found that students who are learning by using guided inquiry models more easily understand and understand the concept of lessons and improve the effectiveness of interaction, team building, learning and interest through work a highly structured group.

MGMP worksheet contains only a summary of the material and the usual problems. In the learning process the teacher gives the important points that must be understood by the students, then the students discuss about molecular geometry material. Some students seem to actively seek and collect data, but there are students who are not active, just sit in groups and wait for the results of discussion of his friend. This worksheet is compiled using newsprint and printed using black ink only so it has not been able to attract students to actively read, search and find its own concept.

The problems contained in this worksheet have not had a relationship between one problem with the next problem and have not been able to guide the students to be able to find their own concept even though the concept found by the student will give more understanding to the student and the student will remember longer<sup>[7]</sup> so that they do not yet have a good understanding of the molecular geometry material

#### CONCLUSIONS:

Based on the results of research and analysis of data that has been implemented concluded that there are significant differences in student learning outcomes that use worksheet based guided inquiry with student learning outcomes using MGMP worksheet. Student learning outcomes using WBGI are higher than using the MGMP worksheet on molecular geometry material.

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